CLAIMS

1. 1. A method of controlling an industrial robot (1), comprising a control unit (1a) and a manipulator (1b) including a tool (2) with a tip (18) comprising a defined TCP, for determining an actual position (p1tu) corresponding to a inaccurate programmed position (p1p) for a spot (22) on a surface (17) of a work piece (15),

characterized in

the tip (18) of the tool (2) is brought to be moved from a first programmed position (p1s) at a distance from the surface (17) in a defined direction towards the work piece (15),

the tip (18) is brought to collide with the surface (17) at a collision point (p1c),

the actual position (p1tu) is computed from the distance between the collision (p1c) and the first programmed position (p1s) in the defined direction of movement.

2. A method according to claim 1, wherein the tool (2) is brought to be moved towards a second position (p1b) programmed to be positioned behind the work piece seen in the direction of movement.

3. A method according to claim 1 or 2, wherein the movement of the tip (18) is brought to be stopped when a created force (F_a) between the work piece (15) and the tip (18) has increased to a predefined value (F_{pd}),

4. A method according to claim 3, wherein the created force (F_a) is brought to be detected by supervising motor torques of axes of the robot.

5. A method according to claim 3, wherein the created force (F_a) is brought to be controlled by soft servo.

6. Use of the method according to any of claims 1-5 when setting up an industrial robot spot welding cell.

7. A method of controlling an industrial robot (1), comprising a control unit (1a) and a manipulator (1b) including a tool (2) comprising a defined TCP, for determining a distance error (w) between an offline programmed position for a target (p_cal) on a surface (19) of a

calibration plate (20) and a corresponding actual position (p_c) due to wear of the tool (2), with the tool orientation normal to the surface (19),

characterized in

moving the robot from a first position (p_s) with the tool orientation normal to the surface (19) such that the tool (2) is brought in touch with the surface (19) of the calibration plate (20) creating an actual position (p_c),

an actual TCP position is read to define a coordinate system,

two reference distances (d_1) and (d_2) are computed from the differences between the TCP positions of (p_c) and (p_s), and

the wear (w) is computed by the difference of (d_1) and (d_2).

8. A method according to claim 7, wherein a pose transformation T_w is applied to a tool data transformation T_t to correct for the wear (w).

9. A method according to claim 8, wherein a tool data transformation T_{new} is stored in a memory of the control unit (1a) and will be used for the next welding operation.

10. A method according to any preceding claim, wherein the robot is moved in normal control servo mode.

11. A method according to any of claims 1-9, wherein the robot is moved in soft servo mode.

12. A method of an industrial robot system comprising an industrial robot (1), including a control unit (1a) and a manipulator (1b) with a tool (2) comprising a defined TCP, and a level indicating means (21) for determining a reference distance (d_{cp})

characterised in that

the level indicating means (21) is brought to comprise a movably attached plate (23),

during movement of the robot, the tool tip (18) is brought to elevate the movable plate (23) into a programmed reference position (p_{cd}) below a stop level (I),

the tool tip (18) is brought to elevate the movable plate (23) from the reference position (p_{cd}) into an upper stop position (22) creating an actual position (p_a),

an actual TCP position is read, and

a reference distance (d_{ref}) is computed from the difference between the actual position (p_a) and the reference position (p_{cd}).

13. A method according to claim 12, wherein the reference difference (d_{ref}) is stored in a memory of the control unit (1a).

14. A method according to claim 12 or 13, wherein the wear of the tool (w_c) after a number of production cycles is determined through computing a difference (d^*) between the reference distance (d_{ref}) and an actual distance (d_a).

15. A method according to claim 14, wherein the tool (2) is brought to comprise a first (2a) and a second gun arm (2b),
the gun tool (2) is brought to be closed in its closed work position (p_{work}),
the reference distance (d_{ref}), the current tool wear (w_c) and the actual distance (d_a) are used for computing the gun arm bending (d_{bend}) in the gun tool in its closed work position (p_{work}).

16. An industrial robot system comprising an industrial robot (1) with a robot tool (2) and a level indicating means (21),
characterized in that
the level indicating means (21) comprising a movably attached plate (23) arranged to be moved by a tool tip (18) of the tool (2).

17. A device according to claim 16, wherein the level indicating means (21) is arranged to comprise a plate movement limiting device (24) including a first fixed stop (22) defining an elevation stop level (I).

18. A device according to claim 17, wherein the plate movement limiting device (24) is arranged to comprise a second fixed stop (25) defining a lowering stop level (II).

19. A device according to claim 16 or 17, wherein the movable plate (23) is arranged with a spring suspension (26).

20. A device according to any of claim 16-19, wherein the movable plate (23) is adapted to pivot about an axis (H).

21. A computer program comprising instructions to influence a processor to carry out the method according to any of claims 1-15.

22. A computer readable medium, wherein the medium comprises a computer program according to claim 21.

23. Use of a method according to any of claims 1-15, an industrial robot device according to any of claims 16-20 or a computer program product according to any of claims 21-22 for carrying out any process working in specific positions.

24. Use according to claim 23, wherein the process for working in specific positions is any of the following methods of joining: spot welding, riveting, or clinching.

25. Use according to claim 23 or 24 in processes comprising laser fibre.